Building Health Check™

Building Health Check is a Division of Pure Air Control Services, Inc.

Containment Plan
Prepared for

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Environmental, Health and Safety Services
Federal Occupational Health
2165 West Park Ct., Suite C
Stone Mountain, GA 30087
301-512-1917

Date of Study: August 28, 2015
Date of Report: September 20, 2015

Report # 6553-19025

Benjamin P. Grogan and Jerry L. Dove Federal Building (FL0033ZZ)
Lobby
2030 SW 145 Avenue
Miramar, FL 33027

Prepared By

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PURE AIR
CONTROL SERVICES INC.

"Indoor Environmental Diagnostics and Remediation Experts"

September 20, 2015

Douglas Ebert, CDR, USPHS, PE
Senior Operations Manager, Environmental, Health and Safety Services
Federal Occupational Health
2165 West Park Ct., Suite C
Stone Mountain, GA 30087

Re: Benjamin P. Grogan and Jerry L. Dove Federal Building (FL0033ZZ) Lobby
Containment Plan Report 6553-19025

Douglas Ebert,

It is Pure Air Control Services, Inc. (Pure Air) privilege to submit this report that describes the Containment Plan evaluation undertaken at Benjamin P. Grogan and Jerry L. Dove Federal Building (FL0033ZZ)Lobby, 2030 SW 145 Avenue, Miramar, FL for your review. Field assessments were completed on August 28, 2015 to address concerns related to the quality of the indoor air.

Thank you for providing Pure Air this opportunity to assist you with your indoor air quality concerns. If you should have any questions regarding this report provided, please call me at 1-800-422-7873, ext. 201.

Respectfully Submitted,

PURE AIR CONTROL SERVICES, INC.

(b) (6) [redacted]

Francisco T. Aguirre, CIAQP, CIEC
Director of Building Sciences

Enclosures

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HVAC FL License #CAC057992

FRACCA Member

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INTRODUCTION

This report describes the Containment Plan evaluation undertaken at Benjamin P. Grogan and Jerry L. Dove Federal Building (FL0033ZZ) Lobby, 2030 SW 145 Avenue, Miramar, FL. The assessment was completed on August 28, 2015 at the request of Mr. Douglas Ebert, CDR, USPHS, PE to address occupant concerns related to the quality of the indoor air.

BACKGROUND

A sculpture created of western red cedar was installed on May, 2015 in the Lobby of the FBI Building has raised concerns as some of the occupants have experienced adverse allergic reactions believed to be linked to the sculpture, which is made of western red cedar. Currently, the sculpture is wrapped in plastic sheeting to control any dust or chemicals that it may potentially be released and is being considered for removal.

In order to establish a baseline of environmental conditions and to elaborate a removal containment plan, Pure Air, conducted a site visit on August 28, 2015 to gather pertinent information. The results for such assessment are the subject of this report.

SCOPE OF WORK

The scope of work is limited to the preparation of a containment plan for the removal of the sculpture and to establish a baseline of environmental parameters for clearance and for future air quality comparison. The following assays were performed to establish the baseline of environmental parameters.

- Spore Traps to determine the concentrations of fungal structures and/or other allergens suspended in the air.
- Surface Tape Preparations to assess the distribution of fungal structures and/or other allergens settled on the environment.
- Measurements of temperature and relative humidity for the assessment of comfort and conditions that might support microbial proliferation and chemical interactions.
- Measurements of carbon dioxide as a surrogate measure for ventilation adequacy.
- Particle counting of respirable-size as an indicator of air filtration efficiency and/or unusual dust levels.
- Measurements of Volatile Organic Compounds as an indicator of the air quality with respect to chemicals released from: building materials; processes; occupant activities; and microbial activity.

ENVIRONMENTAL SUMMARY REPORT

Environmental assays were performed in the first and second level of the lobby. When pertinent, Outside air samples were collected for comparative and control purposes. The results derived from each assay were compared against the corresponding Guidelines to determine acceptability and were tabulated on the following page. Please note that the figures highlighted in yellow (if any) contain values moderately outside the recommended level and are treated as a transition gradient from a normal condition to abnormal or vice versa. Figures highlighted in red (if any) indicate with certainty that an abnormal or detrimental condition exists.

Federal Occupational Health
FBI Building Miramar, FL
Building FL 0033ZZ
Report # 6553-19025

PURE AIR CONTROL SERVICES, INC

Air Quality

Matrix	Parameter	Unit	Guideline*	Ref.	Lobby 1st Floor	Lobby 2nd Floor	Outside Air
Spore Traps	Opaque Particles	cts/m^3	≤35,000 or 1/3 OA	3	10,500	15,300	31,100
	Skin Cell Fragments	cts/m^3	≤7,500	3	13,300	8,310	120
	Insect Biodetritus	cts/m^3	≤200 or 1/3 OA	3	BDL	BDL	BDL
	Fibers	cts/m^3	≤500	3	113	99	BDL
	Fiberglass fibers	cts/m^3	≤12	3	BDL	13	BDL
	Pollen	cts/m^3	≤15 or 1/3 OA	3	BDL	BDL	26
	Fungal Elements	cts/m^3	≤1000 or 1/3 OA	3	39	26	16,000
	Other	cts/m^3	≤6000 or 1/3 OA	3	507	2,200	16,400
Particle	Respirable size	p/l	≤25,000 or 1/3 OA	3	3,938	3,292	52,653
Comfort	Temperature	°F	72 to 78	1	75.1	73.1	91.6
	Relative Humidity	%	30 to 60	1	49.3	53.1	53.1
Ventilation	Carbon Dioxide	ppm	700+OA	2	470	463	370

Settled Aerosols in the Occupiable Space

Matrix	Parameter	Unit	Guideline*	Ref.	Glass Rail	Glass Window	NA
Tape Prep	Opaque Particles	cts/cm^2	≤3000	3	20	8	
	Skin Cell Fragments	cts/cm^2	≤600	3	12	12	
	Insect Biodetritus	cts/cm^2	≤4	3	BDL	BDL	
	Fibers	cts/cm^2	≤120	3	8	BDL	
	Fibergalss Fibers	cts/cm^2	≤4	3	BDL	BDL	
	Pollen	cts/cm^2	≤4	3	BDL	BDL	
	Fungal Elements	cts/cm^2	≤50	3	BDL	BDL	
	Other	cts/cm^2	≤650	3	60	24	

Foot Notes

Units	Units	Reference	Notes	Notes
CFU/m^3 = Colony Forming Units per Cubic Meter of Air	°F = Degrees Fahrenheit	1. ASHRAE 55 - 2010	BDL = Below Detectable Limit	NA = Not Aplicable
cts/m^3 = Counts per Cubic Meter of Air	% = Percent	2. ASHRAE 62.1 - 2010	OA = Outside Air	* = See Guidelines Section
cts/cm^2 = Counts per square centimeter	ppm = Parts per Million	3. Pure Air Control Services, Inc.	Red = Abnormal/Detrimental	
p/l = Particles per liter of Air		4. Molhave 1990	Yellow = Moderately elevated	

Federal Occupational Health
Benjamin P. Grogan and Jerry L. Dove
Federal Building (FL0033ZZ) Lobby
Project #: 6553-19025
Field Date: August 28, 2015

ENVIRONMENTAL SUMMARY REPORT

CHEMICAL	UNITS	MEDIUM	Guideline*			Lobby 1st Floor	Lobby 2nd Floor
			ATSDR MRL	NIOSH TWA	Molhave 1990		
2-Methyl-2-Propanol	ppm	Air	NL	100	—	0.00727	0.00712
2-Methyl-1-Propene	ppm	Air	NL	NL	—	0.00748	0.00630
Acetone	ppm	Air	13	750	—	0.00782	0.00877
Ethyl Alcohol	ppm	Air	NL	NL	—	0.02701	0.04271
Ethyl Acetate	ppm	Air	NL	NL	—	0.00681	0.00533
Isopropyl Alcohol	ppm	Air	NL	400	—	0.05750	0.08507
Pentane	ppm	Air	NL	120	—	0.01108	BDL
Toluene	ppm	Air	0.08	100	—	0.01608	0.03515
Formaldehyde	ppm	Air	0.008	0.016	—	BDL	BDL
Total VOC	ppm	Air	—	—	0.64	0.14105	0.19045

Samples were scanned for 82 VOCs; however, only the compounds listed were detected.
All figures are expressed as parts per million (ppm) and represent the average concentration for the monitoring period.
NA = No ATSDR MRL are listed for this compound
ATSDR MRL= Agency for Toxic Substance and Disease Registry Minimum Risk Level 14 to 365 Day Exposure. 12/2009
NIOSH = National Institute for Occupational Safety and Health

Notes:
ppm = Parts per million
NL = Not Listed
Red figures indicate the parameter exceeded the recommended Guideline.
* = See Details in Guidelines for IAQ Section
TWA = Time Weighed Average

CONCLUSIONS

Air samples collected with the spore trap method (Air-O-Cell Cassettes) for the assessment of fungal structures suspended in the air revealed levels well within the recommended guideline in both levels of the Lobby. No concerns were raised by this assay method.

Air samples collected with the spore trap method (Air-O-Cell Cassettes) also provided insight into the composition and concentration of airborne dust which could be allergenic for susceptible individuals and/or vehicles transporting microorganisms that could increase the incidence of bacterial and viral infections. The results revealed slightly elevated levels of skin cell fragments in both levels of the Lobby. Skin cells are the most common type of dust detected from the air and surfaces of homes and offices. Skin cell fragments are not considered a major allergen; however, it is a medium colonized by bacteria and other flora that may give rise to odor problems and unsanitary conditions if allowed to layer the environment. The spore trap collected from the 2nd floor Lobby also contained traces of fiberglass fibers but raised no significant concerns at this time.

Surface tape preparations were collected to assess the settled distribution of fungal structures and other allergens. The analytical results for the surface tape preparations collected from both levels revealed fungal structures and allergens in concentrations well within the recommended guideline.

The ventilation requirement for most buildings is supplied by the HVAC system and/or by infiltration of the outside air. Carbon dioxide (CO_2) concentrations are used as surrogate measure to roughly assess the adequacy of the ventilation system. The results for the CO_2 measurements made at the time of the field evaluation were well within the recommended guideline. No concerns were raised by this assay method.

Dust particles whose overall diameter ranges from 0.3 to 5.0 microns are recognized as respirable-size particles. Respirable-size particles are generated by a broad variety of processes and activities and there are increasingly more studies liking associations between the concentrations of particles and health effects. In this case, the respirable-size particle concentrations detected in both locations tested were well within the recommended levels, which raised no concerns at this time.

Temperature and relative humidity measurements of the ambient air were used to assess comfort, as well as an environmental factor that may increase the prevalence of indoor air quality problems (e.g. microbial activity, indoor allergens, viral infections, allergic rhinitis, asthma, ozone production, odors, etc.). In this assessment, the comfort in both locations tested (Lobby 1st and second floor) fell well within the recommended comfort envelope. No concerns were raised by this assay method.

CONCLUSIONS (continued)

The samples collected in the in both levels of the Lobby for the assessment of Volatile Organic Compounds (VOCs) were analyzed for approximately 82 common compounds; however, only the enumerated compounds in the Environmental Summary Table were detected. The results for each of the compounds detected fell well within the three guidelines provided: Agency for Toxic Substance and Disease Registry Minimum Risk Level (MRL) for 365 and over Day Exposure list; National Institute for Occupational Safety and Health (NIOSH) Time Weighed Average, and Molhave 1990. No concerns were raised by this assay method.

CONTAINMENT DIAGRAM

(b) (7)(F)

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RECOMMENDATIONS

The following recommendations were designed to resolve issues described in this report. No prioritization was implied by this listing, however, it was anticipated all items discussed would be addressed.

This project involves removal of a sculpture approximately 16ft high and roughly 7ft at its widest diameter which is believed to potentially release allergens and therefore it needs to be removed from the building in a safe manner utilizing containment and engineering controls that will protect the occupants and the building itself. The objective is to prevent the release of any potential effluents from the removal process. Hence, this remediation project needs to be completed under proper containment, quality assurance/quality control protocols. The diagram provided in pages 8 and 9 outlines the containment and engineering controls required for this project.

The methods and materials used for erecting and sealing the containment need to be of good workmanship and of sufficient strength to maintain its integrity when subjected to the negative air pressure of negative 10 Pascals and forces caused by repeated use. The diagram provided illustrates the boundaries and engineering controls of the recommended containment

Polyethylene sheeting draped from the ceiling grid to form vertical barriers need to be of fire retardant 6-mil thickness and fastened with "poly-hangers" and sealed with pressure sensitive tape to the walls and floor.

Polyethylene sheeting draped from hard ceilings to form vertical barriers need to be of fire retardant 6-mil thickness and secured with vertical poles separated no more than 6 ft fastened and sealed with pressure sensitive tape to the walls ceiling and floor.

All doorways need to be sealed with fire retardant polyethylene sheeting of 6-mil thickness and secured in place using vertical poles and/or pressure sensitive tape, the entryway used for containment egress needs to be provided with a slit and zipper or a slit and flaps on the outside of the containment.

All return air vents in the containment need to be sealed off with fire retardant polyethylene sheeting of 6-mil thickness and tape. Lay-in diffusers may be sealed with polyethylene sheeting tucked between the diffuser and the ceiling grid. The supply air terminals may need to be sealed off to achieve negative air pressure the IH for the project will make final decision on this issue.

All flooring needs to be clean, dry and properly protected against physical damage.

Two Air Filtration Devices (AFD) equipped with HEPA filtration and rated for 2000 cfm per floor need to be provided inside the containment space to recover the airborne effluents generated for the duration of the sculpture removal. The AFD needs to be able to turn over the containment air volume at least 4 times per hour.

RECOMMENDATIONS (continued)

The containment must maintain a negative air pressure of 5 Pascals ± 2 relative to the surrounding area outside the containment for the entire duration of the project until clearance has been provided. This may be achieved utilizing Negative Air Machines (NAM) equipped with true and certified HEPA filtration and speed control. The NAM must be connected to the containment barrier in a way that air will be drawn from the containment and discharged outside the containment. The discharged air may be exhausted to the adjacent space or to the overhead space acting as return air plenum.

A redundant AFD rated for 2000 CFM outside the containment entrance and in front of the NAM exhaust needs to be provided throughout the entire work period.

The remediation contractor shall ensure that each work site is maintained in a safe and clean manner, and that no debris is allowed to remain at the work site upon completion of each work area or at the end of a work shift. All debris generated from the work shall be disposed of in accordance with all applicable federal, state, and local requirements. Any staging or work site meeting area (inside or outside the building) shall be kept clean of debris and cigarette butts.

Environmental cleaning will include vacuum cleaning all exposed surfaces e.g. walls, flooring, carpeting, doors, smooth and hard surface furniture, blinds, windows, doors, plumbing fixtures, etc. utilizing direct contact vacuuming with soft brushes and then wiped with a cloth dampened with a mild solution of amended water.

Cleaned surfaces need to be able to pass the cleanliness verification test by Visual Inspections; Wipe & Turbidity and/or Surface Tape Preparation microscopy.

The industrial hygienist for the project shall ensure that the containment and engineering controls employed by the remediation contractor are of good workmanship and able to keep the remediation effluents from permeating the space outside the containment. The industrial hygienist shall inspect and ensure that the barricades and signage used by the remediation contractor are of adequate size and number to prevent non-authorized persons from entering the work zones.

The IH for this project shall monitor the site on a daily bases while the remediation work is in progress identifying work and work practices that are not in compliance with the mold remediation plan and perform all inspections and testing required in the Statement of Work.

In order to ensure that excessive particles are not being released from the containment, the IH for this project shall monitor the concentrations of particles (0.3 microns and larger) suspended in the air outside the containment and at the exhaust of the AFD and NAM. These will be monitored at least every other hour and at the end of each work period using laser diode particle counters.

RECOMMENDATIONS (continued)

The concentrations outside the containment shall not exceed a baseline level measured prior to starting demolition more than 25%. If the particle concentrations exceed the aforesaid bench mark, the sculpture removal work shall stop and the integrity of the containment and NAM shall be inspected thoroughly for breaches and/or external sources. Additional AFD may be needed outside the containment space to maintain the particle levels below the aforementioned action level.

The HEPA filters of the AFD will also be monitored using a particle counter. Prior to starting the remedial work, all AFD and NAM (discharging air in the occupiable space) need to be provided with an air diffuser (polyester filter) properly secured on the blower discharge. This is needed to minimize excessive air turbulence that may stir dust settlement and consequentially aggravate dust aerosolization. All AFD and NAM shall perform at the specified 99.97% for 0.3 micron-size particles.

The pressure of the containment relative to the adjacent space shall be maintained at negative 5 Pascals ± 2 and monitored at least every other hour. If the pressure of the containment deviates more than the specified range, the art removal work shall stop and the integrity of the containment and NAM shall be inspected for anomalies and breaches thoroughly.

When the sculpture removal is completed, the IH for this project shall immediately notify the representative of GSA, and along with the contractor will conduct a final visual inspection. If during this inspection any visible debris or dust is observed, the contractor shall re-clean the work area without any additional cost to the Government.

Following the visual inspection and approval from GSA Representative, but prior to removing the containment, the IH shall verify the cleanliness of the environment by visual inspections and testing. Testing of the indoor environment will be conducted from miscellaneous surfaces employing one or more of the following methods: Surface Tape Preparation, Wipe & Turbidity (standardized white glove test), wipe cultures and moisture content readings. The quality of the air will be assessed by drawing air samples using the Spore Trap Method and particle counts.

Any surface that fails the cleanliness verification needs to be re-cleaned by the remediation contractor without additional cost to the Governmen.

The sculpture needs to be removed in sections individually wraped in 6 mil poly from its present location to the outside of the building using the pathway highlighted in page 10.

LABORATORY RESULTS

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Laboratory Analysis Report
Aerobiology
Spore Trap Assay

Client :	Resource Management Group, Inc	PACS ID# :	06553
Jobsite :	FBI Building Containment & Monitoring Statue Proje	Work Order # :	019025
Location :	2030 S.W. 145th Ave	Project Date :	8/27/2015

Unit :	N/A	Lab Sample# :	128439	Date Lab. Rec'd. :	9/1/2015
Zone :	Lobby 1st Floor	Field Sample# :	1	Date Analyzed :	9/2/2015
Test Site :	Center of Room	Sample Date :	8/28/2015	Date Issued :	9/14/2015
Diagnostic Tech :	LAB	Sample Time :	10:00 AM	Sample Serial # :	21655314
SampleType :	Microscopic Particle Assay (SporeTrap)			Sampling Device:	AirOCell

Particle Identification	Raw Count	Total Count (Cts/m³)	Percent of Total Count
Opaque Particles	**104**	**10500**	**42.9 %**
Skin Cell Fragments	**132**	**13300**	**54.3 %**
Insect Biodetritus	**BDL**	**BDL**	**N/A**
Total Fibers	**17**	**113**	**0.461 %**
Manmade Fibers	17	113	0.461 %
Total Pollen	**BDL**	**BDL**	**N/A**
Total Fungal Elements/Spores	**6**	**39**	**0.159 %**
Dematiaceous Fungal Spore Elements	3	20	0.0816 %
Fungal Spore Elements	2	13	0.0531 %
Dematiaceous Fungal Hyphal Elements	1	6	0.0245 %
Total "Other"	**76**	**507**	**2.07 %**
Black Particles	76	507	2.07 %
Total Counts:	**335**	**24,500**	**100 %**

Comments :

Method of Analysis: EDLAB SOP-7/05001
Detection Limits* : 6 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 10.00 minutes, with 45 traverses under 400x Magnification)
*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.
BDL = Below Detection Limits **N/A** = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By : _____

Approved By (b) (6) [redacted]
Rajiv R. Sahay, Ph.D.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Laboratory Analysis Report
Aerobiology
Spore Trap Assay

Client :	Resource Management Group, Inc	PACS ID# :	06553
Jobsite :	FBI Building Containment & Monitoring Statue Proje	Work Order # :	019025
Location :	2030 S.W. 145th Ave	Project Date :	8/27/2015

Unit :	N/A	Lab Sample# :	128441	Date Lab. Rec'd. :	9/1/2015
Zone :	Lobby 2nd Floor	Field Sample# :	5	Date Analyzed :	9/2/2015
Test Site :	Center of Room	Sample Date :	8/28/2015	Date Issued :	9/14/2015
Diagnostic Tech :	LAB	Sample Time :	10:15 AM	Sample Serial # :	21655188
SampleType :	Microscopic Particle Assay (SporeTrap)			Sampling Device:	AirOCell

Particle Identification	Raw Count	Total Count (Cts/m³)	Percent of Total Count
Opaque Particles	**101**	**15300**	**59.1 %**
Skin Cell Fragments	**110**	**8310**	**32.1 %**
Insect Biodetritus	**BDL**	**BDL**	**N/A**
Total Fibers	**17**	**112**	**0.432 %**
Manmade Fibers	14	93	0.359 %
Fiberglass Fibers	2	13	0.0502 %
Plant Fibers	1	6	0.0232 %
Total Pollen	**BDL**	**BDL**	**N/A**
Total Fungal Elements/Spores	**4**	**26**	**0.100 %**
Fungal Spore Elements	3	20	0.0772 %
Curvularia species	1	6	0.0232 %
Total "Other"	**109**	**2200**	**8.49 %**
Black Particles	109	2200	8.49 %
Total Counts:	**341**	**25,900**	**99.8 %**

Comments :

Method of Analysis: EDLAB SOP-7/05001

Detection Limits* : 6 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 10.00 minutes, with 45 traverses under 400x Magnification)

*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.

BDL = Below Detection Limits N/A = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By : _____

Approved By : (b) (6)

Rajiv R. Sahay, Ph.D.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Laboratory Analysis Report
Aerobiology
Spore Trap Assay

Client :	**Resource Management Group, Inc**	PACS ID# :	**06553**
Jobsite :	**FBI Building Containment & Monitoring Statue Proje**	Work Order # :	**019025**
Location :	**2030 S.W. 145th Ave**	Project Date :	**8/27/2015**

Unit :	**N/A**	Lab Sample# :	**128447**	Date Lab. Rec'd. :	**9/1/2015**
Zone :	**Outside Air**	Field Sample# :	**9**	Date Analyzed :	**9/2/2015**
Test Site :	**Flag Pole**	Sample Date :	**8/28/2015**	Date Issued :	**9/14/2015**
Diagnostic Tech :	**LAB**	Sample Time :	**10:45 AM**	Sample Serial # :	**21655211**
SampleType :	**Microscopic Particle Assay (SporeTrap)**			Sampling Device:	**AirOCell**

Particle Identification	Raw Count	Total Count (Cts/m³)	Percent of Total Count
Opaque Particles	**206**	**31100**	**48.9 %**
Skin Cell Fragments	**18**	**120**	**0.189 %**
Insect Biodetritus	**BDL**	**BDL**	**N/A**
Total Fibers	**BDL**	**BDL**	**N/A**
Total Pollen	**4**	**26**	**0.0409 %**
Pollen Grains	4	26	0.0409 %
Total Fungal Elements/Spores	**2399**	**16000**	**25.2 %**
Basidiospores	2318	15500	24.4 %
Ascospores	22	147	0.231 %
Dematiaceous Fungal Spore Elements	12	80	0.126 %
Cladosporium species	9	60	0.0943 %
Fungal Spore Elements	8	53	0.0833 %
Aspergillus/Penicillium-Like Spores	8	53	0.0833 %
Curvularia species	5	33	0.0519 %
Exosporium species	4	26	0.0409 %
Fusarium species	4	26	0.0409 %
Torula species	4	26	0.0409 %
Dematiaceous Fungal Hyphal Elements	3	20	0.0314 %
Beltrania species	1	6	0.0094 %
Nigrospora species	1	6	0.0094 %
Total "Other"	**163**	**16400**	**25.8 %**
Black Particles	163	16400	25.8 %
Total Counts:	**2790**	**63,600**	**99.9 %**

Comments :

Method of Analysis: EDLAB SOP-7/05001
Detection Limits* : 6 Cts/m³ (Flow rate: 15.00 lpm, Exposure Time: 10.00 minutes, with 45 traverses under 400x Magnification)
*Detection limits may vary with flow rate, exposure time and microscopic fields observed for particle count at a defined magnification.
BDL = Below Detection Limits **N/A** = Not Applicable

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By : _____

Approved By : (b) (6) [redacted]
Rajiv R. Sahay, Ph.D.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Opaque Particles Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Opaque Particles

These particles may originate from inorganic or organic sources in nature. However, it appears opaque when observed under light microscopy. It has various shape and sizes. It may be regular or irregular in shape. On an average it can be measured less than one micron to well over fifty microns with some exceptions. Commonly these particles include but are not limited to dust & debris, paint, combustions, emission, ash, silica and others.

These particulates are significant from a health/allergy point of view especially in case of respiratory disorder.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Fibers Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Fiberglass Fibers

Fiberglass is a material made from extremely fine fibers of glass. In indoor environment it is used as an insulating material for HVAC systems. It appears as a smooth-walled, elongated tube-like structure under the microscope with varying size ranges (avg, range 1-micron to over 1000 -microns).

It is listed as an irritant and is also known to be a carcinogen.

Plant Fibers

Technically, Plant fibers are known as Plant Trichomes. A Plant Trichome is the hairy out growth from the aerial part of the plant. Not all plants can produce plant trichomes. Plant trichomes vary greatly in their size and shape. On an average, these structures measure from a few microns to well over a few millimeters. It may be a simple unicellular elongated structure or a complex multi-cellular structure. Sometimes also filled with various biochemicals.

Plant trichomes are significant from an allergenic/disease point of view especially eczema and other dermal allergies.

Manmade Fibers

Man-made fibers may come from natural raw materials like cellulose or from synthetic chemicals like rayon, nylon, etc. In indoor environments, some important sources of man made fiber include carpet, cellulose based building materials, clothing, paper and paper products, etc. Size of these fibers varies from a few microns to a several centimeters; however, an average size range may be 1 micron to over 500 microns.

Health implications of these particles are not well described, however some of the man-made fibers are important from an allergy point of view especially for dermal allergy.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Pollen Species Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Pollen Grains

Pollen grains are the male reproductive unit of flowering plant usually produced by anthers. They are microscopic particles of various shape (mostly spheriodal or ellipsoidal), sizes (5 micron to more than 200 micron). Pollen grains may also have furrows or pore or both on their surface that helps in their identification.

They can be air-borne and remain in the ambient air depending upon thier bouyancy. They may be carried some distance from the immediate vicinity of the parent. Some pollen grains are allergenic in nature.

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Spores / Fungal Elements Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Dematiaceous Fungal Hyphal Elements

Fungal hyphae that are brown to black. No identification to genus level can be made.

Dematiaceous Fungal Spore Elements

Fungal spores that are brown to black. No identification to genus level can be made.

Fungal Spore Elements

Fungal spores that are hyaline or colorless. No identification to genus level can be made.

Ascospores

A kind of spore produced by the membranes of ascomycetes. Size and shape (circular to elongated) are greatly variable. May be unicellular or multi-cellular in structure. Development takes place within asci (a type of fruiting body), responsible for sexual propagation. Many of the ascospores can become airborne. This classification comprises a very large group of fungi, some allergenic, some rarely pathogenic, some pathogenic to plants only. A more definitive identification requires culturing and growth of the spores on laboratory media.

Aspergillus/Penicillium-Like Spores

Conidia that are characteristic of the following genera: Aspergillus, Penicillium, Paecilomyces, Scopulariopsis, and Gliocladium. Identification to genus level can not be made.

Basidiospores

Basidiospores are those produced from the basidium of Basidiomycetes. They are almost always produced as four spores / basidium. The most reliable feature that separates basidoispores from ascospores and deuteromycetes spores is the presence of an off-center apiculus where the spores was attached to the basidium. Apart from that basidiospores may be rough or smooth, darkly pigmented or completely clear, spherical, oval, ellipsoidal or hot-dog shaped. Basidiospores seldom exceed 18um in length. Some common basidiospore-producing fungi are rusts, smuts, jelly fungi, and puffball mushrooms. Most of the Basidiomycetes fungi are decomposers where some of them are pathogenic to plant and animals or allergenic in nature.

Beltrania species

Beltrania species are commonly isolated from various species of oak (Quercus) trees. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). There have not been any documented reports of human infections.

Cladosporium species

Cladosporium species are found worldwide and are among the most common fungi found in the air, soil, foodstuffs, paint, textiles, bird feathers, and on plants. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). Rarely, they can be an opportunist human pathogen causing chromoblastomycosis. They can cause a hypersensitivity pneumonitis known as "hot tub lung disease" and an immediate-type hypersensitivity-type I (IgE-mediated) extrinsic asthma.

Curvularia species

Curvularia species are found worldwide and are very common. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). They can be isolated from the air, plants (especially grasses), sand dune soil, and soil. Rarely, they can be an opportunist human pathogen causing allergic reactions, eye (corneal) infections, mycetoma, and infections in immunocompromised patients.

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Spores / Fungal Elements Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Exosporium species

A type of dematiaceous fungus. Mostly saprophytic in nature. Conidia are pseudoseptate several-celled structure with a prominent scar. Size varies from 28-70 microns. Not reported as aeroallergens.

Fusarium species

Fusarium species are found worldwide and are commonly isolated from plants, soil, caves, salt marshes, mangrove mud, insects, gerbils, bird feathers, water, wooden furniture, and wood pulp. Some isolates produce the mycotoxin trichothecene which can cause disease in humans and animals. Trichothecene targets the circulatory, alimentary, skin, and nervous systems. Some isolates produce the mycotoxin vomitoxin on cereal grains which produce disease by either ingestion or inhalation of the contaminated grains. It can be an opportunist human pathogen causing allergic disease, eye, skin, and nail infections.

Nigrospora species

Nigrospora species are found worldwide and are common. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). They can be isolated from plants, soil, and foodstuffs. There have not been any reports of human infections, however, they can cause allergic disease.

Torula species

Torula species are found worldwide and is very common in temperate climates. The hyphae, conidiophores, and conidia are pigmented olivaceous-brown (dematiaceous). They can be isolated from air, soil, decaying plants, wood, fresh water, sea water, bird nesting materials, and nuts. There have not been any reports of human infections, however, they can cause allergic disease.

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Other Material Identified from Spore Trap Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID # : **06553**
Work Order # : **019025**

Black Particles

These microscopic particles may originate from an organic source material. They greatly vary in their shape and sizes depending on their origin. However, an average size ranges between 1-micron to 5-micron with some exceptions. It may be regular or irregular in shape. In the indoor environment some important source/cause of these particles includes but are not limited to combustion, burning of oil & candles, chimney shoot, automobile exhaust, neoprene (rubber compound that applied to the inside surface of fiber glass duct liner), and other organic materials emitted by copier machines, printers, abraded paints etc.

These particles may influence health and hygienic condition of dwellers.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Laboratory Analysis Report
Surface Microscopy
Tape Prep Assay

Client :	**Resource Management Group, Inc**	PACS ID# :	**06553**
Jobsite :	**FBI Building Containment & Monitoring Statue Proje**	Work Order # :	**019025**
Location :	**2030 S.W. 145th Ave**	Project Date :	**8/27/2015**

Unit :	**N/A**	Lab Sample# :	**128440**	Date Lab. Rec'd. :	**9/1/2015**
Zone :	**Lobby 1st Floor**	Field Sample# :	**2**	Date Analyzed:	**9/2/2015**
Test Site :	**Glass Rail**	Sample Date:	**8/28/2015**	Date Issued :	**09/14/15**
Diagnostic Tech :	**LAB**	Sample Time:	**10:00 AM**	Sample Serial #:	**41313**
Sample Type:	**TapePrep Assay**				

Particle Identification	Raw Count	Total Count (Cts/cm²)	Percent of Total Count
OpaqueParticles	**5**	**20**	**20.0 %**
Skin Cell Fragments	**3**	**12**	**12.0 %**
Insect Biodetritus	**BDL**	**BDL**	**N/A**
Total Fibers	**2**	**8**	**8.00 %**
Manmade Fibers	2	8	8.00 %
Total Pollen	**BDL**	**BDL**	**N/A**
Total Fungal Elements/Spores	**BDL**	**BDL**	**N/A**
Total "Other"	**15**	**60**	**60.0 %**
Black Particles	15	60	60.00 %
Total Counts:	**25**	**100**	**100 %**

Method of Analysis: EDLAB SOP-7/13001

BDL = Below Detection Limit: No particles were reported from the microscopically observed area on the specimen slide (at 10x10 or 10x40 magnification).

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By : (b) (6) [redacted]

Approved By : *Rajiv R. Sahay, Ph.D.*

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Laboratory Analysis Report
Surface Microscopy
Tape Prep Assay

Client :	Resource Management Group, Inc	PACS ID# :	06553
Jobsite :	FBI Building Containment & Monitoring Statue Proje	Work Order # :	019025
Location :	2030 S.W. 145th Ave	Project Date :	8/27/2015

Unit :	N/A	Lab Sample# :	128444	Date Lab. Rec'd. :	9/1/2015
Zone :	Lobby 2nd Floor	Field Sample# :	6	Date Analyzed:	9/2/2015
Test Site :	Glass Window	Sample Date:	8/28/2015	Date Issued :	09/14/15
Diagnostic Tech :	LAB	Sample Time:	10:15 AM	Sample Serial #:	41314
Sample Type:	TapePrep Assay				

Particle Identification	Raw Count	Total Count (Cts/cm²)	Percent of Total Count
OpaqueParticles	2	8	33.3 %
Skin Cell Fragments	3	12	50.0 %
Insect Biodetritus	BDL	BDL	N/A
Total Fibers	BDL	BDL	N/A
Total Pollen	BDL	BDL	N/A
Total Fungal Elements/Spores	BDL	BDL	N/A
Total "Other"	1	4	16.7 %
Black Particles	1	4	16.67 %
Total Counts:	6	24	100 %

Method of Analysis: EDLAB SOP-7/13001

BDL = Below Detection Limit: No particles were reported from the microscopically observed area on the specimen slide (at 10x10 or 10x40 magnification).

The results in this report apply only to the sample(s) specifically listed above and tested at Environmental Diagnostics Laboratory. Unless otherwise noted, samples were received in good condition. Laboratory-prepared Quality Control (QC) samples are analyzed with the samples routinely; however, unless a blank (control) is received, the result for the control is not compared. Quantitative data is based on 3 significant figures; Grand Total may not equal 100% due to rounding.

Quality Controlled By : _____

Approved By : (b) (6) [redacted]

Rajiv R. Sahay, Ph.D.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Opaque Particles Identified from Tape Prep Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Opaque Particles

These particles may originate from inorganic or organic sources in nature. However, it appears opaque when observed under light microscopy. It has various shape and sizes. It may be regular or irregular in shape. On an average it can be measured less than one micron to well over fifty microns with some exceptions. Commonly these particles include but are not limited to dust & debris, paint, combustions, emission, ash, silica and others.

These particulates are significant from a health/allergy point of view especially in case of respiratory disorder.

EDLab
Environmental Diagnostics Laboratory
1-800-422-7873, Ext. 301

Fibers Identified from Tape Prep Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID# : **06553**
Work Order # : **019025**

Manmade Fibers

Man-made fibers may come from natural raw materials like cellulose or from synthetic chemicals like rayon, nylon, etc. In indoor environments, some important sources of man made fiber include carpet, cellulose based building materials, clothing, paper and paper products, etc. Size of these fibers varies from a few microns to a several centimeters; however, an average size range may be 1 micron to over 500 microns.

Health implications of these particles are not well described, however some of the man-made fibers are important from an allergy point of view especially for dermal allergy.

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Other Material Identified from Tape Prep Assays

Client : **Resource Management Group, Inc**
Jobsite : **FBI Building Containment & Monitoring Statue Proje**

PACS ID # : **06553**
Work Order # : **019025**

Black Particles

These microscopic particles may originate from an organic source material. They greatly vary in their shape and sizes depending on their origin. However, an average size ranges between 1-micron to 5-micron with some exceptions. It may be regular or irregular in shape. In the indoor environment some important source/cause of these particles includes but are not limited to combustion, burning of oil & candles, chimney shoot, automobile exhaust, neoprene (rubber compound that applied to the inside surface of fiber glass duct liner), and other organic materials emitted by copier machines, printers, abraded paints etc.

These particles may influence health and hygienic condition of dwellers.

ADVANCED CHEMICAL SENSORS INC.
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AIHA LAP, LLC
ACCREDITED LABORATORY
INDUSTRIAL HYGIENE
ISO/IEC 17025:2005
LAB #102047

Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

9/5/2015

ENVIRONMENTAL DIAGNOSTICS LABORATORY
4911 Creekside Dr., Suite C
Clearwater FL 33760

ORGANIC VAPOR ANALYSIS REPORT

SAMPLE NO	DATE	NAME	EXPOSURE TIME (hr)	CONCENTRATION (ppm)
59502	08/28/15 to 08/29/15	128446 6553-19025008	10:30 — 8:58 = 22.47	

Badge No 59502

Name	PPB	ug/m3
2-methyl-1-propene	6.30	15.12
Ethyl Alcohol	42.71	80.30
Acetone	8.77	21.05
Isopropyl Alcohol	85.07	209.26
2-Methyl-2-Propanol	7.12	21.37
Ethyl Acetate	5.33	18.64
Toluene	35.15	131.80
	total	497.53

Note: 1 ppm=1,000 ppb

The chemicals tested are listed on the next page. The chemicals that are not reported above are not detected.

No concentration is above 0.03 ppm.

Sample Condition: OK

19007

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

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Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

9/5/2015

ENVIRONMENTAL DIAGNOSTICS LABORATORY
4911 Creekside Dr., Suite C
Clearwater FL 33760

The OSHA permissible exposure limits based on an 8 hour period are:

Acetone-1,000 ppm
Acetonitrile-40 ppm
Acrylonitrile-2 ppm
Amyl Acetate-100 ppm
Allyl Chloride-1 ppm
Benzene-1 ppm
Benzyl Chloride-1 ppm
1,3-Butadiene-1 ppm
Butane-800 ppm(NIOSH)
2-Butanone (MEK)-200 ppm
2-Butoxyethyl acetate-5 ppm (NIOSH)
Butyl Acetate-150 ppm
Butyl Cellosolve-50 ppm
1-Butyl Alcohol-100 ppm
2-Butyl Alcohol-150 ppm
Chlorobenzene-75 ppm
Chloroform-10 ppm(ACGIH)
Cyclohexane-300 ppm
Cyclohexene-300 ppm
Cyclohexanol-50 ppm
Cyclohexanone-50 ppm
Diacetone Alcohol-50 ppm
Diacetyl-0.01 ppm (ACGIH)
1,4-Dichlorobenzene-75 ppm
1,2-Dichloroethane-50 ppm
1,2-Dichloroethylene-200 ppm
Dimethyl Sulfide-10 ppm(ACGIH)
Dimethylsulfoxide-250 ppm(AIHA)
Dioxane-100 ppm
1,2-Epoxybutane (AIHA)
Ethyl Acetate-400 ppm
Ethyl Alcohol-1,000 ppm
2-Ethyl-1-Hexanol-20 ppm(EU limit)
Ethyl Benzene-100 ppm
Ethyl Ether-400 ppm
Heptane-500 ppm
2-Heptanone-100 ppm
Hexane-500 ppm
Hexane Isomers-100 ppm (NIOSH)
Hexone (MIBK)-100 ppm
Isobutane-800 ppm (NIOSH)
Isobutyl Acetate-150 ppm
Isoprene-2 ppm(AIHA)
Isopropyl Alcohol-400 ppm
1-Methoxy-2-Propanol-100 (NIOSH)
Methyl Acetate-200 ppm
Methyl Acrylate-10 ppm
2-Methylbutane-1,000 ppm
2-Methylbutyl Acetate-50 ppm(ACGIH)
2-Methyl-1-Propanol-100 ppm
Methylcyclohexane-500 ppm
Methyl Chloroform-350 ppm
5-Methyl-2-Hexanone (MIAK)-100 ppm
Methyl Methacrylate-100 ppm
Methyl-t-Butyl Ether-50 ppm(ACGIH)
Methyl Styrene-50 ppm(NIOSH)
Methylene Chloride-25 ppm
Nonane-200 ppm(NIOSH)
Octane(All Isomers)-500 ppm
Pentane-1,000 ppm
Pentane Isomers-1,000 ppm
1-Pentanol-100 ppm(AIHA)
Pentyl Acetate-100 ppm
2-Pentanone-200 ppm
Perchloroethylene-100 ppm
Alpha-Pinene-20 ppm (ACGIH)
2-Propoxyethanol-20 ppm (EU limit)
n-Propyl Acetate-200 ppm
n-Propyl Bromide-0.1 ppm(ACGIH)
Pyridine-5 ppm
Propylene Glycol Methyl Ether Acetate-50 ppm(EU limit)
Propylene Oxide-100 ppm
Styrene-100 ppm
Tetrahydrofuran-200 ppm
Toluene-200 ppm
1,1,1-Trichloroethane-350 ppm
Trichloroethylene-100 ppm
1,2,4-Trimethylbenzene-25 ppm(NIOSH)
Vinyl Acetate-10 ppm(ACGIH)
Vinyl Chloride-1 ppm
Xylene-100 ppm

There is no U.S. limit for d-limonene. The German Research Foundation exposure limit is 20 ppm, based on an 8 hour period.
There is no exposure limit for: Ethyl Methacrylate, Ethyltoluene, 1-Hexanol, Propyl Benzene, Benzene,1-Chloro-4 (Trifluoromethyl), 2-Ethylhexyl Acetate, Methylcyclopentane, 1,2-Dimethylcyclopentane, 2-Methylheptane, Isobutyl Isobutyrate, Camphene, Eucalyptol, Cymene, Triacetin, Acetoin.

Method of Analysis: EPA TO-15 (Supplemented by OSHA and NIOSH methods)

19007

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

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Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

9/5/2015

ENVIRONMENTAL DIAGNOSTICS LABORATORY
4911 Creekside Dr., Suite C
Clearwater FL 33760

ORGANIC VAPOR ANALYSIS REPORT

SAMPLE NO	DATE	NAME	EXPOSURE TIME (hr)	CONCENTRATION (ppm)
59505	08/28/15 to 08/29/15	128442 6553-19025004	10:16 − 8:56	= 22.67

Badge No 59505

Name	PPB	ug/m3
2-methyl-1-propene	7.48	17.95
Ethyl Alcohol	27.01	50.77
Acetone	7.82	18.76
Isopropyl Alcohol	57.50	141.45
Pentane	11.08	32.69
2-Methyl-2-Propanol	7.27	21.81
Ethyl Acetate	6.81	23.83
Toluene	16.08	60.28
	total	367.55

Note: 1 ppm=1,000 ppb

The chemicals tested are listed on the next page. The chemicals that are not reported above are not detected.

No concentration is above 0.03 ppm.

Sample Condition: OK

19006

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

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Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

9/5/2015

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4911 Creekside Dr., Suite C
Clearwater FL 33760

The OSHA permissible exposure limits based on an 8 hour period are:

Acetone-1,000 ppm
Acetonitrile-40 ppm
Acrylonitrile-2 ppm
Amyl Acetate-100 ppm
Allyl Chloride-1 ppm
Benzene-1 ppm
Benzyl Chloride-1 ppm
1,3-Butadiene-1 ppm
Butane-800 ppm(NIOSH)
2-Butanone (MEK)-200 ppm
2-Butoxyethyl acetate-5 ppm (NIOSH)
Butyl Acetate-150 ppm
Butyl Cellosolve-50 ppm
1-Butyl Alcohol-100 ppm
2-Butyl Alcohol-150 ppm
Chlorobenzene-75 ppm
Chloroform-10 ppm(ACGIH)
Cyclohexane-300 ppm
Cyclohexene-300 ppm
Cyclohexanol-50 ppm
Cyclohexanone-50 ppm
Diacetone Alcohol-50 ppm
Diacetyl-0.01 ppm (ACGIH)
1,4-Dichlorobenzene-75 ppm
1,2-Dichloroethane-50 ppm
1,2-Dichloroethylene-200 ppm
Dimethyl Sulfide-10 ppm(ACGIH)
Dimethylsulfoxide-250 ppm(AIHA)
Dioxane-100 ppm
1,2-Epoxybutane (AIHA)
Ethyl Acetate-400 ppm
Ethyl Alcohol-1,000 ppm
2-Ethyl-1-Hexanol-20 ppm(EU limit)
Ethyl Benzene-100 ppm
Ethyl Ether-400 ppm
Heptane-500 ppm
2-Heptanone-100 ppm
Hexane-500 ppm
Hexane Isomers-100 ppm (NIOSH)
Hexone (MIBK)-100 ppm
Isobutane-800 ppm (NIOSH)
Isobutyl Acetate-150 ppm
Isoprene-2 ppm(AIHA)
Isopropyl Alcohol-400 ppm
1-Methoxy-2-Propanol-100 (NIOSH)
Methyl Acetate-200 ppm
Methyl Acrylate-10 ppm
2-Methylbutane-1,000 ppm
2-Methylbutyl Acetate-50 ppm(ACGIH)
2-Methyl-1-Propanol-100 ppm
Methylcyclohexane-500 ppm
Methyl Chloroform-350 ppm
5-Methyl-2-Hexanone (MIAK)-100 ppm
Methyl Methacrylate-100 ppm
Methyl-t-Butyl Ether-50 ppm(ACGIH)
Methyl Styrene-50 ppm(NIOSH)
Methylene Chloride-25 ppm
Nonane-200 ppm(NIOSH)
Octane(All Isomers)-500 ppm
Pentane-1,000 ppm
Pentane Isomers-1,000 ppm
1-Pentanol-100 ppm(AIHA)
Pentyl Acetate-100 ppm
2-Pentanone-200 ppm
Perchloroethylene-100 ppm
Alpha-Pinene-20 ppm (ACGIH)
2-Propoxyethanol-20 ppm (EU limit)
n-Propyl Acetate-200 ppm
n-Propyl Bromide-0.1 ppm(ACGIH)
Pyridine-5 ppm
Propylene Glycol Methyl Ether Acetate-50 ppm(EU limit)
Propylene Oxide-100 ppm
Styrene-100 ppm
Tetrahydrofuran-200 ppm
Toluene-200 ppm
1,1,1-Trichloroethane-350 ppm
Trichloroethylene-100 ppm
1,2,4-Trimethylbenzene-25 ppm(NIOSH)
Vinyl Acetate-10 ppm(ACGIH)
Vinyl Chloride-1 ppm
Xylene-100 ppm

There is no U.S. limit for d-limonene. The German Research Foundation exposure limit is 20 ppm, based on an 8 hour period.
There is no exposure limit for: Ethyl Methacrylate, Ethyltoluene, 1-Hexanol, Propyl Benzene, Benzene,1-Chloro-4 (Trifluoromethyl), 2-Ethylhexyl Acetate, Methylcyclopentane, 1,2-Dimethylcyclopentane, 2-Methylheptane, Isobutyl Isobutyrate, Camphene, Eucalyptol, Cymene, Triacetin, Acetoin.

Method of Analysis: EPA TO-15 (Supplemented by OSHA and NIOSH methods)

19006

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

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AIHA LAP, LLC
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INDUSTRIAL HYGIENE
LAB #102047

Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

TO:

ENVIRONMENTAL DIAGNOSTICS LABORATORY
4911 Creekside Drive, Suite C
Clearwater FL 33760

DATE: 9/4/2015

FORMALDEHYDE VAPOR ANALYSIS REPORT

SAMPLE NO	DATE	NAME	EXPOSURE TIME (hr)	CONCENTRATION (ppm)
GW6883	08/28/15 to 08/29/15	Lab ID: 128441	10:16 – 8:56 = 22.67	Less than 0.002

For indoor air concentrations of formaldehyde vapor above 0.1 parts of formaldehyde per million parts of air (0.1 ppm), many people have symptoms, such as eye and throat irritation. The California Air Resources Board recommends 0.05 ppm as the maximum safe level.

People with chemical sensitivity may be effected by lower levels. The U.S. Agency for Toxic Substances and Disease Registry (ATSDR) found no one effected below a concentration of 0.008 ppm.

Note: "Less than" value is the minimum quantitation level for the exposure time used.

Sample Condition: OK

Method of Analysis: *NIOSH Method 2016*
Date Received: 09/03/15
Date Analyzed: 09/03/15

86374

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

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AIHA LAP, LLC ACCREDITED LABORATORY
INDUSTRIAL HYGIENE
LAB #102047

Reviewed by:
Laurence D. Locker, Ph.D.
Laboratory Director

TO:

ENVIRONMENTAL DIAGNOSTICS LABORATORY
4911 Creekside Drive, Suite C
Clearwater FL 33760

DATE: 9/4/2015

FORMALDEHYDE VAPOR ANALYSIS REPORT

SAMPLE NO	DATE	NAME	EXPOSURE TIME (hr)	CONCENTRATION (ppm)
GW6866	08/28/15 to 08/29/15	Lab ID: 128445	10:30 – 8:58 = 22.47	Less than 0.002

For indoor air concentrations of formaldehyde vapor above 0.1 parts of formaldehyde per million parts of air (0.1 ppm), many people have symptoms, such as eye and throat irritation. The California Air Resources Board recommends 0.05 ppm as the maximum safe level.

People with chemical sensitivity may be effected by lower levels. The U.S. Agency for Toxic Substances and Disease Registry (ATSDR) found no one effected below a concentration of 0.008 ppm.

Note: "Less than" value is the minimum quantitation level for the exposure time used.

Sample Condition: OK

Method of Analysis: *NIOSH Method 2016*
Date Received: 09/03/15
Date Analyzed: 09/03/15

86375

The values reported are the average concentrations for the monitoring period used, based on the information provided by the user.
Analysis results for unexposed samples ("Blanks"), used for quality assurance testing, are not subtracted from the sample results reported.

METHODS

Microscopy:

Countable bioaerosols concentrations were determined by Microscopy using two procedures: Spore Trap Assays and Tape Lift Preparations.

Spore Trap Assays (Air-O-Cell cassettes) employ a gel-coated glass slide inside an air sampling cassette and a constant flow pump calibrated at 15 liters per minute. This rate was verified in the field utilizing an in line flowmeter. Air was passed over the coated slide causing airborne particles to adhere to the gel. Direct microscopy evaluation at 200X and 400X magnification of stained gels provided insight into the composition and identification of the airborne particles. Results were reported in counts per cubic meter of air (cts/m^3).

Surface Tape Preparations (Bioscan) provided insight into the identification and composition of surface pollutants. Clear adhesive tape was applied to the surface of interest and then transferred to a microscope slide. Microscopy evaluations were conducted at 200X and 400X magnification of the trapped particles. The results were reported as counts per square centimeter (cts/cm^2).

Temperature, Relative Humidity, and Carbon Dioxide:

Real time measurements of temperature, relative humidity, carbon dioxide were obtained using a TSI Data Logger Model #9565-P. Prior to using, the instrument values were compared against a Bacharach Model U4Q (12-7011) Sling Psychrometer and Sensidyne Gastec colorimetric tubes.

Respirable-size Particle Counts:

Respirable-size particle counts were determined using a Laser Diode Particle Counter manufactured by Met One, Model GT-321. Calibration was checked in the field using a purge filter. Cumulative counts for particle range of 0.3, 0.5, 1, 2, and 5 microns were reported as total particles per liter of air p/l.

Formaldehyde:

Formaldehyde analysis was completed using an IAQ Screen Check Formaldehyde badge. Utilizing a sorption media (bead technology); the badges were collected and analyzed using the NIOSH Method 2016, which employs high performance liquid chromatography. The badges for this assessment were exposed for a period of more than 7 hours, consistent with recommendations by the badge manufacturer. The results were expressed in parts per billion (ppb).

METHODS (continued)

Volatile Organic Compounds:

Organic Vapor analysis was completed using an IAQ Screen Check Organic Vapor badge. Utilizing a sorption media (bead technology); the badges were collected and analyzed using the EPA TO-15 Method, which employs high performance liquid chromatography. The badges for this assessment were exposed for a period of more than 7 hours, consistent with recommendations by the badge manufacturer. The results were provided as Total Volatile Organic Compounds and expressed in micrograms per cubic meter of air (mg/m^3).

GUIDELINES FOR INDOOR AIR QUALITY

At present, federal, state, or local standards for unacceptable airborne or surface microbial concentrations do not exist, principally because some individuals are more susceptible to fungal antigens and the allergenicity of each microbe differs. In most cases however, it is expected the prevalence of indoor species identified from the air be similar or identical to the outdoors, albeit in lower concentrations.

Over the past 18 years, over 123,000 samples have been analyzed by the Environmental Diagnostics Laboratory (EDL) and processed in the proprietary database (Computer Assisted Air Management Program: CAAMP) which includes evaluations of over 7,200 buildings, 47,200 test sites, covering 54 states (4/12). EDL recommends the following Indoor Air Quality Guidelines that pertain to non-industrial or non-specialized environments e.g. offices, homes, schools, hotels, assisted living facilities, etc.

The guidelines are considered to be representative of "normal" indoor environments and are subject to the investigators discretion to interpret the environmental conditions based on the sampling results, as well as the conditions that existed at the time of the evaluation. In the event recognized pathogenic microorganisms are detected in any assay, the numeric guidelines play a secondary role in the acceptability of the environment and the situation needs to be addressed individually.

Non-Culturable Fungi from Air:

The types and concentrations of fungal structures suspended in the air are collected using a non-culturable test method known as Spore Trap Assay. This assay is analyzed by direct microscopy to determine the concentration of airborne fungal structures. It is expected that the indoor concentration and types of fungi suspended in the air would be of similar biodiversity to the outside air, but in concentrations of approximately one-third the outdoor air level. However; when the outdoor air fungal concentration is less than 3,000 cts/m^3, the indoor air concentrations should be approximately 1000 cts/m^3 or less.

Nuisance Dust from Air:

Nuisance dust suspended in the air is collected using the Spore Trap Assay, which is analyzed by direct microscopy to determine the types and concentration of airborne aerosols. Aerosols such as pollen, insect biodetritus, opaque particles, and "others" are mostly derived from the outside environment. It is expected that the indoor air concentrations of these aerosols would be approximately one-third the concentration of the outdoor air. However, when the outdoor air concentrations of pollen, insect biodetritus, opaque particles and "others" are less than 45, 600, 105,000, and 18,000 cts/m^3 respectively, the indoor air concentrations should be approximately 15, 200,

GUIDELINES FOR INDOOR AIR QUALITY

35,000 and 6,000 cts/m³ respectively, or less. Aerosols, such as fibers and skin cells, are mostly derived from the indoor environment; therefore, the concentrations expected in the indoor air are not dependent of the outdoor air levels. It is expected that the concentrations of skin cells fragments and fibers would be approximately 7,500 and 500 cts/m³, respectively, or less.

Fungal Structures and Nuisance Dust from Surface Tape Imprints collected in the Living Space:

Surface tape imprints collected within the living space are useful in determining extent of fungal matter settled in the environment. It is expected that surfaces in the living space and where routine maintenance and housekeeping is performed would contain traces of fungal structures of approximately 50 counts per square centimeter (50 cts/cm^2).

Nuisance dust (Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others) settled in the living space is assessed using the Surface Tape Preparation, which is analyzed by direct microscopy. It is expected that surfaces in the living space and where routine maintenance and housekeeping is performed, the levels of Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others would be present in trace levels of approximately 3,000, 600, 4, 120, 4, and 650 counts per square centimeter (cts/cm^2), respectively.

Fungal Structures and Nuisance Dust from Surface Tape Imprints collected from the <u>Non-Living Space</u>:

Surfaces within a building but not in the living space (e.g. overhead spaces, air conveyance systems, wall cavities, etc) are expected to contain higher dust levels than those present in the living space. Fungal structures below 100 cts/cm² are considered normal.

Nuisance dust (Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others) settled in the Non-Living Space is assessed using the Surface Tape Preparation, which is analyzed by direct microscopy. Due to the settlement of dust over the course of time, it is anticipated that surfaces in the Non-Living Space would contain higher concentrations of dust than those in the conditioned space. The expected levels of Opaque Particles, Skin Cell Fragments, Insect Parts, Fibers, Pollen and Others settled in the Non-Conditioned Space are 5,000, 450, 20, 200, 24, and 1,900 counts per square centimeter (cts/cm^2), respectively.

GUIDELINES FOR INDOOR AIR QUALITY

Respirable-size Particulate:

In general, the concentration of respirable-size particles in buildings with good maintenance, air filtration, and acceptable air quality range from 10,000 to 25,000 cts/l. However when the outside air concentrations exceed 75,000 cts/l, the indoor air should contain approximately one-third of the outside air levels.

Comfort:

There is no specific set of enforceable values for temperature and relative humidity; however, comfort depends principally on these two factors combined. For minimizing the prevalence of indoor air quality problems (e.g. microbial activity, indoor allergens, viral infections, allergic rhinitis, asthma, ozone production, odors, etc.) and preserving the integrity of the building and its contents, Pure Air recommends that the relative humidity be maintained in the range of 30 to 60% and below 70% for the prevention of mold proliferation. The temperature for the most part is a preference of the occupants and depends on the level of clothing insulation; however, most people at rest will find the environment comfortable somewhere in the range of 72 to 78 °F.

Ventilation:

Carbon dioxide concentrations were used as surrogate measure to roughly assess the adequacy of the ventilation system. The American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) Standard 62.1-2013 suggests that a space with maintained concentrations not greater that 700 ppm above outdoor air levels will be properly ventilated with respect to human bioeffluents (body odor).

INDOOR AIR QUALITY CONSIDERATIONS

Biological Factors:

Water is essential to all life, and the chemical reactions that lead to biological growth depend on an adequate water supply[1]. Fungi are ubiquitous in the environment, although they particularly thrive in wet or moist environments where there is a nutrient source, and the temperature ranges from 40° to 100°F [2]. Fungi can grow on surfaces and within pores of building materials and can give rise to odor perception problems and health concerns. Although only a few species of fungi produce toxigenic metabolites that invade living cells and cause infectious disease[3], many of these strains do not routinely produce mycotoxins,[4] and the potential to be exposed to such substances is controversial. However, most fungi do produce proteins that are antigenic and can cause hypersensitivity in predisposed individuals[5].

Research conducted throughout the world has reported associations between moisture in buildings and fungal contamination[6]. All building materials contain moisture at some degree; however, the control of excessive moisture is crucial in the prevention of microbial colonization and substrate physical degradation. Limiting the water availability (a_w) of materials in buildings to ≤ 0.75 (ideally ≤ 0.65) should be a primary goal in the prevention of microbial amplification. Maintaining the relative humidity of the ambient air between 30 and 60% does not necessarily guarantee that the building materials are dry and foster no microbial growth. Cold spots and air infiltration tend to reach the dew point and increase the a_w sufficiently to support microbial growth. Because a_w is such an important factor for microbial growth and survival, the moisture content in building materials is the prime indicator of potential microbial activity.

Allergens:

Allergens are any substance of chemical or biological nature that can elicit an immune mediated response, commonly referred to as an allergic reaction or type 1

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[1] ACGIH, *Bioaerosols-Assessment and Control*, American Conference of Governmental Industrial Hygienists, Cincinnati, 1999.

[2] EPA/NIOSH, *Building Air Quality: A guide for Building Owners and Facility Managers*, U.S. Government Office, Washington D.C. 1991.

[3] Ibid

[4] ACGIH, *Guidelines for the Assessment of Bioaerosols in the Indoor Environment*, American Conference of Governmental Industrial Hygienists, Cincinnati, 1989.

[5] Burge HA, Airborne Allergenic Fungi – Classification, Nomenclature, and Distribution, Immunol. Clin. Nort Am., 9(2):307.1989.

[6] *Anonymous, Task Force Update*, The Synergist, 10(2)L37, 1999.

INDOOR AIR QUALITY CONSIDERATIONS (continued)

immediate hypersensitivity. The initial exposure of an individual to an allergen in sufficient concentrations such that manifestation of hypersensitivity occurs in subsequent exposures is called sensitization. As with any other substance the risk of exposure depends on the allergenicity and concentration of the substance, the duration of exposure, and most importantly host susceptibility. Fungal elements, fecal pallets and dried body fragments of dust mites and cockroach, as well as skin dander and saliva from cat are the most common and problematic allergens in indoor environments.

Ventilation:

Carbon dioxide concentrations are typically measured as a surrogate value to assess outdoor air ventilation rates in occupied buildings. Briefly, in the absence of sources of combustion, the human occupants of a building are the primary generators of carbon dioxide. If a person enters a room the concentration of carbon dioxide will begin to rise. If the population of the room remains constant, the concentration of carbon dioxide will eventually stabilize and reach equilibrium.

The equilibrium concentration of carbon dioxide in an occupied space is thus a function of the amount of carbon dioxide generated by the occupants and the rate of outdoor air ventilation. Therefore, carbon dioxide concentrations measured in an occupied space can be used as a rough indication of the adequacy of outdoor air ventilation[7]. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has indicated that, "Comfort (odor) criteria is likely to be satisfied if the ventilation rate is set so that the indoor air concentrations do not rise more than 700 ppm over the outdoor air levels ppm"[8].

Comfort:

People have varying thermal comfort zones and varying sensitivity to temperature relative humidity and, as such, finding a thermal environment that will suit every one may be virtually impossible. There are several perspectives from authors on the effects of temperature and relative humidity on comfort and health. The American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) Standard 55-2013 describes the comfort zone as a range of operative temperatures based on humidity ratio, air speed (< 40 fpm), metabolic rate (met) between .1 and

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[7] Environmental Protection Agency (EPA), *IAQ Diagnostics: Hands-On Assessment of Building Ventilation and Pollutant Transport (Course Manual)*, prepared by University of Tulsa, Dept. of Chemical Engineering.

[8] ASHRAE Standard 62-2013. *Ventilation for Acceptable Indoor Air Quality.* Atlanta GA: American Society of Heating, Refrigerating, and Air-Conditioning Engineers, 1989.

INDOOR AIR QUALITY CONSIDERATIONS (continued)

1.3, clothing insulation (clo) between .5 and 1, in which the majority of the occupants (approximately 80%) find the environment comfortable (see Graph provided)

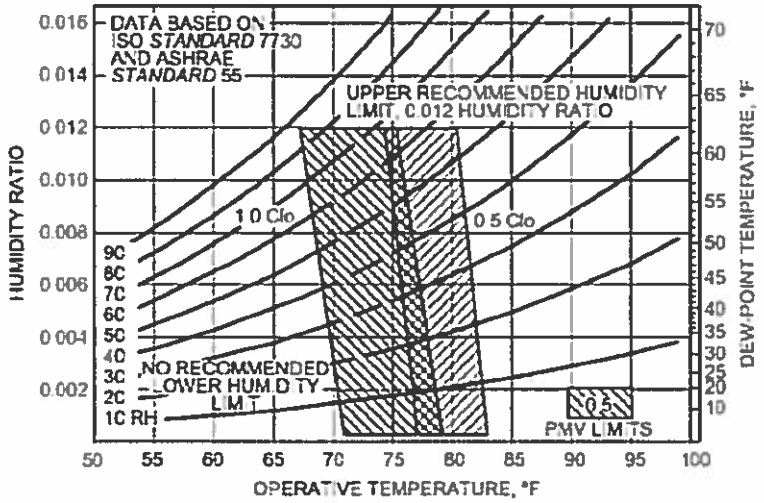

Fig. 5 ASHRAE Summer and Winter Comfort Zones
[Acceptable ranges of operative temperature and humidity with air speed ≤ 40 fpm for people wearing 1.0 and 0.5 clo clothing during primarily sedentary activity (≤1.1 met).]

The 2011 ASHRAE Handbook HVAC Applications recommends design criteria for temperature and relative humidity based on the type of facilities. For instance, they recommend summer (cooling) design conditions for office buildings of 74 to 78 °F and 50 to 60% relative humidity; and 70 to 74 °F and 20 to 30% relative humidity for winter (heating).

The 2013 ASHRAE Handbook Fundamentals p 10.17 suggests that thermal comfort for a person at rest is experienced at 75 °F ± 3 °F. Additionally they provide a table with various human responses to the thermal environment (see table below) where a neutral comfortable sensation is experienced approximately in the range of 74 to 80 °F.

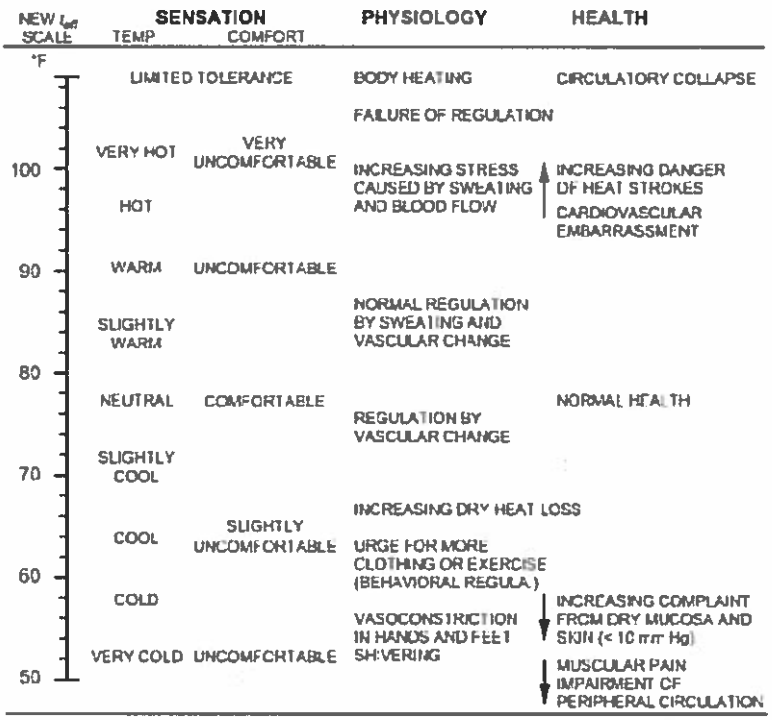

Fig. 1 Related Human Sensory, Physiological, and Health Responses for Prolonged Exposure

For residential settings the Air-conditioning Contractors of America (ACCA) 8th Edition Manual J recommends design conditions of 75 °F and 50% for cooling and 70 °F for heating.

DISCLAIMERS:

The results addressed in this report represent the building environmental conditions at the time the evaluation was undertaken. These conditions my change over the course of time as a result of dynamic and/or seasonal factors such as but not limited to occupancy rates, building operations, mechanical performance, weather, sporulation cycles, etc.

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